

II. "An Attempt to determine the Adiabatic Relations of Ethyl Oxide. Part I. Gaseous Ether." By W. RAMSAY, F.R.S., Professor of Chemistry in University College, London, and E. P. PERMAN, B.Sc. Received March 16, 1891.

(Abstract.)

The object of the research described in the memoir is the determination of the behaviour of ether in the state of gas approaching towards the state of liquid, when heat is communicated to it, so as to alter its condition adiabatically.

Previous researches by one of the authors in conjunction with Dr. Sydney Young have yielded data regarding the relations of pressure, temperature, and volume of gaseous and of liquid ether from which the values of the isobaric and of the isochoric differentials are obtainable. Such results lead directly to a knowledge of the differences between the specific heats at constant pressure and those at constant volume; and these differences are not constant, but vary with varying volume, pressure, and temperature.

The memoir contains an account of experiments made to determine the ratio between the specific heats at constant pressure and those at constant volume. The velocity of sound in gaseous ether was determined at various temperatures, pressures, and volumes; and by means of the isothermal differentials, and the experimental results for the velocity of sound, the ratios between the two specific heats were calculated. From the differences and the ratios of the specific heats, the values of the specific heats were deduced.

The general conclusion is that, for any constant volume, the specific heat, whether at constant volume or at constant pressure, decreases to a limiting value with rise of temperature, and subsequently increases; and that the change with temperature is more rapid, the smaller the volume.

At large volumes, the specific heats tend towards independence of temperature and volume, while at small volumes, the influence of change of temperature and volume is very great.

The authors are at present investigating similar relations for liquid ether.